

X. *Synopsis of the Species of Panorpa occurring in Europe and the adjoining Countries; with a Description of a singular new Species from Java.* By R. McLACHLAN, F.L.S., Sec. Ent. Soc.

[Read 15th March, 1869.]

IN this paper I have attempted to give a synopsis of the European species of *Panorpa*, with comparative diagnoses in a tabular form, and remarks. I enumerate twelve species, whereof two are insufficiently known, and five are new, two of the latter coming from Mingrelia, a country which, though politically forming part of Europe, is more decidedly Asiatic.

Owing to the similarity of markings, much confusion has existed; but the decided characters exhibited in the abdomen of the male, especially in the four terminal segments, separate the species very readily; the form of the two narrow appendices lying on the face of the claw-bearing terminal segment is also a means of differentiating closely allied forms; and the parts under these appendices would, no doubt, well repay attentive study, in the living insect. The markings in the wings furnish less important characters; for though each species has a certain typical arrangement of the markings, the deviations are so many, and frequent, that reliance cannot be placed on it alone. The neuration is probably still more given to vary, especially in the number of the furcations; but the comparative length of the sub-costal vein divides the species into two groups. The number of teeth in the claws of the tarsi is not noticed in this paper, because, in dry specimens, one or more of the teeth are frequently hidden by the large spongy pulvillus, and hence this character is a dangerous one on which to ground specific distinctions.

In the citations of authors, only the most important are noticed; and I have omitted Klug's monograph altogether, because all the European species are grouped therein under *P. communis*, and no indication given of the male abdominal characters; in Westwood's monograph the same omission occurs for the European forms; but at the time these two works were published, these all-important characters were little understood. In Walker's British Museum Catalogue several species are confounded under *P. germanica* and *communis*.

The plate accompanying this synopsis gives figures of each species, with the most general arrangement of the markings, and also enlarged outlines of the terminal segments of the male abdomen and appendices.

In conclusion, I express my thanks to Baron de Selys Longchamps, and Chevalier Victor Ghiliani, for their liberal gift and loan of examples, without which aid this work could not have been attempted.

Genus PANORPA.

Tabula Specierum Europæarum.

- A. Sub-costa alarum omnium costæ medium (nec ultra) tangens.
 - a. Alæ parce brunneo-punctatæ. Abdominis* ♂ segmenta 7 et 8 modica, conica.
P. alpina, Rambur.
 - aa. Alæ valde atro-punctatæ fasciatæque. Abdominis segmenta 7 et 8 elongata, angustata, conica; 7 supra ad basin conspicue tuberculatum.
P. caucasica, (De Selys).
- B. Sub-costa alarum anticarum pterostigma tangens.
 - b. Abdominis ♂ segmenta 7 et 8 conica.
 - c. Segmentum 6 apicem versus gradatim angustius, truncatum; 7 et 8 modice elongata.
 - d. Appendices segmenti 9 elongatæ, haud truncatæ.
 - e. Alæ fasciâ subapicali completâ. Segmentum 6um 7mo longius. *P. communis*, L.
 - ee. Alæ fasciâ sub-apicali interruptâ. Segmentum 6um 7mo æquale.
P. connexa, McLach.

* *Panorpæ* abdomen censeo novem segmenta habere, quorum primum sub metanoto partim latet.

dd. Appendices segmenti 9 breves, ad apicem dilatatae truncatae.

f. Appendices breviores, ad apicem recte truncatae, vix rotundatae.

P. germanica, L.

ff. Appendices longiores, ad apicem oblique truncatae, processus segmenti 3 valde major. . . . *P. gibberosa*, McLach.

cc. Segmentum 6 oblongum, supra concavum et ad apicem triangulariter productum, lateraliter excisum; 7 et 8 brevia.

P. meridionalis, Rambur.

bb. Abdominis ♂ segmentum 7 plus minusve irregulariter cylindricum, supra dilatatum, 8 vix conicum, 6 quadratum vel oblongum, profunde lateraliter excisum.

g. Alae conspicue atro-fasciatae et maculatae.

h. Segmentum 7 supra ad basin valde dilatatum; appendicibus segmenti ultimi linearibus, elongatis, fere rectis, divaricatis.

P. annexa, (De Selys).

hh. Segmentum 7 supra in medio paullo dilatatum; appendicibus segmenti ultimi brevibus, gradatim latioribus, ad basin apicemque convergentibus. *P. Ghilianii*, McLach.

gg. Alae paullo fusco-nigro signatae. Segmentum 7 fere regulariter cylindricum; appendicibus segmenti ultimi rectis, linearibus, divaricatis. *P. cognata*, Rambur.

Species mihi non satis cognitae.

a. Alae flavo-tinctae, fasciis duabus, maculis duabus vel tribus, apicibusque conspicue atro-signatae. (♂ ignotus). *P. picta*, Hagen.

β. Alae punctis tribus ante medium, linea irregulari obliqua pone stigma, apicibusque fuscis; pterostigmate magno rufo. . *P. rufostigma*, Westwood.

Tabula magnitudinum.

<i>P. alpina</i> ,	exp. alar.	12-13½ lin. (anglic.)	=25-28 millim.
<i>P. caucasica</i>	,, ,,	12 lin.	=25 mill.
<i>P. communis</i>	,, ,,	12-15½ lin.	=25-32 mill.
<i>P. germanica</i>	,, ,,	10-12 lin.	=21-25 mill.
<i>P. gibberosa</i>	,, ,,	12 lin.	=25 mill.
<i>P. connexa</i>	,, ,,	13 lin.	=27 mill.
<i>P. meridionalis</i>	,, ,,	12-15 lin.	=25-31 mill.
<i>P. annexa</i>	,, ,,	13½-14 lin.	=28-29½ mill.
<i>P. Ghilianii</i>	,, ,,	10½-13 lin.	=22-27 mill.
<i>P. cognata</i>	,, ,,	13½-14½ lin.	=28-30½ mill.
<i>P. picta</i>	,, ,,	14½-17 lin.	=30½-37 mill.
<i>P. rufostigma</i>	,, ,,	13 lin.	=27 mill.

A. *Sub-costa in all the wings becoming confluent with the costa about half-way between the base and apex.*

1. PANORPA ALPINA, Rambur. (Pl. IV. fig. 1).

P. alpina, Rambur, Névrop. p. 330 (1842). *P. variabilis*, Brauer, Neurop. Aust. p. 35 (1857).

Found only in elevated districts, and probably occurs in all the mountain ranges of central Europe. Halloy in Belgium (De Selys). Has not yet been noticed in Britain.

The species with the wings least spotted of all, there being only scattered brown dots, whereof that at the pterostigma is the largest. Third abdominal segment (♂) considerably produced in the middle of its apex above; sixth slightly narrowed from base to apex, truncate; seventh and eighth cone-shaped, each as long as the sixth, narrow at the base, and the seventh with an indistinct tubercle at that part above; appendices of the last segment straight, flattened, and linear, short; claws of this segment short.

Rambur's type has lost, as he notes, the terminal segments, and he does not notice the short sub-costa, but the example now in De Selys' collection, proves the identity of the species with that of Brauer.

2. PANORPA CAUCASICA, n. sp. (Pl. IV. fig. 2).

P. caucasica, De Selys, MS.

Taken in Mingrelia, by M. T. Deyrolle, in 1868. Two ♂ and three ♀ in De Selys' collection.

A species with the wings strongly marked; the sub-apical fascia forms a large, irregularly oblong spot, extending from the costa half across the wing, and then emitting two narrow curved branches to the inner margin. The antepenultimate and penultimate segments (♂) extremely long, and very narrow at the base, and very gradually and regularly dilated, the antepenultimate (7th) with a distinct tubercle at the extreme base above; the claws of the terminal segment very long. The whole body, including the terminal segments, deep black.

A very distinct and well-marked species.

B. *Sub-costa in the anterior wings reaching to the pterostigma.*

3. PANORPA COMMUNIS, Linné. (Pl. IV. fig. 3).

P. communis, Linn. Faun. Suec. p. 384 (1761), et auct.

The commonest species in Northern and Central Europe.

The sub-apical fascia is angulate, and usually furcate on the inner margin, especially in the ♀, the apical spot large, and more or less broken up into smaller spots in its lower portion. The third abdominal segment (♂) is scarcely produced above at its apex; the sixth very long and truncate at the apex; seventh and eighth each shorter than the sixth, conical; appendices of the terminal segment long and cylindrical, approximating at the base and apex.

Var? *diffinis*, mihi. From Belgium and Piedmont I have ♂ ♀ of an insect which I cannot separate from *P. communis* by any certain structural characters, yet it has a somewhat different aspect, being smaller (exp. alar. 12 lin.) than usual, and more compact; the third segment is, perhaps, more sensibly produced in the middle. Baron de Selys Longchamps finds it with the type-form, yet preserving its peculiar facies: further investigation may perhaps establish its right to specific distinction. An insect figured in Imhoff and Labram's "Insekten der Schweiz," under the name of *P. vulgaris*, may possibly be the same as this.

4. PANORPA GERMANICA, Linné. (Pl. IV. fig. 4).

P. germanica, Linn. Syst. Nat. p. 915 (1767); Curtis, Brit. Ent. pl. 696; Ramb. Névropt. p. 329; Eaton, Ann. and Mag. Nat. Hist. 1867, p. 397. *P. affinis*, Leach, Zool. Misc. ii. p. 98, pl. 94, fig. 2 (1815); Steph. Ill. p. 52. *P. apicalis*, Steph. Ill. p. 52 (1836). *P. montana*, Brauer, Neurop. Aust. p. 36 (1857). *P. borealis*, Steph. Ill. p. 53 (1836)?

Almost equally common with the last in all Northern and Central Europe, and certainly the true species described by Linné, according to the type in his collection.

Wings with a slight brownish tinge; markings maculate (not fasciate), the apical spot moderate (varies very greatly in number and intensity of markings). The third abdominal segment (♂) is strongly produced in the middle of the apical margin above; the sixth scarcely longer than the seventh, truncate at the apex; seventh and eighth cone-shaped; appendices of the terminal segment short, flattened, dilated and truncate at the apex.

5. PANORPA GIBBEROSA, n. sp. (Pl. IV. fig. 5).

Montenegro (♂) and Isle of Tinos (♀). Taken by M. Erber, and sent by him to the Baron de Selys Longchamps, who has submitted it to my examination.

A species evidently allied to *P. germanica*, yet decidedly distinct; in size rather larger. In the ♂ the wings have a faint yellowish tinge; in the basal half are one or two indistinct dots; at the pterostigma is a large quadrate blackish-brown spot, and a dot below it, and the apex is also blackish-brown. The third abdominal segment is produced, in the middle of its apical margin above, into a large rounded hump; the sixth longer than the seventh, formed as in *P. germanica*; the seventh and eighth equal, conical; appendices of the terminal segment formed somewhat as in *P. germanica*, but longer; the apex oblique, produced at the inner angle, and afterwards very slightly excised; beyond the apex of each of these appendices is to be seen the point of a large crotchet which underlies them (this is also evident in *P. germanica*, but less conspicuously).

The ♀, from Tinos, which I consider to pertain to the same species, has the wings more strongly marked; the basal spots are larger, that at the pterostigma smaller,

but below it are two others, the three forming a maculose fascia; the apex as in the ♂; several of the transverse veinlets much clouded.

The ♂ much resembles some forms of *P. cognata* in its markings. There is a strong probability that this is *P. rufostigma*, Westwood (*vide post*, p. 68), and the ♀ above noted agrees remarkably in its markings with those of the ♂ of that species, as described by Professor Westwood; yet both sexes want the large red pterostigma from which the name was derived, that portion of the wings being only more decidedly yellower in M. Erber's examples. Under these circumstances, I think it best to describe the species as distinct. The abdominal characters are much as in *P. germanica*, but the hump on the third segment is very much larger, and the appendices of the last segment differ, although formed after the same plan.

6. PANORPA CONNEXA, n. sp. (Pl. IV. fig. 6).

Taken in Mingrelia, by M. T. Deyrolle, in 1868. Two ♂ in De Selys' collection.

Of the same size as *P. germanica*, and allied thereto. The wings show a wedge-shaped spot extending from the pterostigma half across the wing, with an elongate spot on the inner margin, the two markings forming an interrupted sub-apical fascia; the apical spot small; two or three small spots in the basal half. Third abdominal segment (♂) not produced in the middle of the apical margin above; sixth as in *germanica*; seventh and eighth conical, more elongate than in *germanica*, the seventh slightly the longer; appendices of terminal segment long, linear, slightly dilated towards the apex, but not truncate.

7. PANORPA MERIDIONALIS, Rambur. (Pl. IV. fig. 7).

P. meridionalis, Rambur, Névrop. p. 329 (1842); Ed.

Pict. Névrop. d'Espagne, p. 83, pl. viii. fig. 9-12.

Middle and South of France, Pyrenees, Spain.

A large species, with the wings very strongly marked with deep black, and the veins also black: ordinarily there is an isolated black spot in the middle of the base, two large opposite spots before the middle (nearly forming an interrupted fascia), a costal spot in the middle, a

sub-apical fascia furcate in its lower half, and a broadly black apex, in which are two pale dots. The third abdominal segment (♂) scarcely produced in the middle of the apex above; sixth oblong, the upper surface concave and produced at the apex in a triangular form, the sides excised (not edged with yellow); seventh and eighth cone-shaped, short, narrow at the base, and very much dilated at the apex; appendices of the terminal segment linear, flattened, approximating at the base and apex (a small lobe at the base of the claws of this segment). Head and terminal segments bright reddish.

This species has the sixth segment formed after the manner of that in the succeeding species, but the seventh and eighth both cone-shaped, as in the preceding.

8. *PANORPA ANNEXA*. (Pl. IV. fig. 8).

P. annexa, De Selys, MS.; *P. meridionalis*, Schneider, Stett. Zeit. 1845, p. 340 (*nec* Rambur). *P. cognata*, var., Hagen, Ann. Soc. Ent. France, 1860, p. 747, (*nec* Rambur).

Monte Viso (Piedmont), Sicily; probably in all Italy.

All the markings smaller and less intense than in *P. meridionalis*, the apical border enclosing one large hyaline spot in its lower half; the veins less strongly black. Third abdominal segment (♂) slightly produced in the middle of its apical margin above; sixth short, quadrate, broader than long, the lateral margins deeply excised (ordinarily edged with yellow), the apex above scarcely produced; seventh longer than the sixth, inserted below the excision, viewed from the side its lower edge is straight, its upper edge greatly swollen near the base, then deeply concave, and finally raised at the apex; eighth sub-cylindrical, scarcely cone-shaped, slightly swollen above towards the base; appendices of the last segment straight, linear, flattened, slightly divergent from base to apex (a small lobe at the base of the claws of this segment). Head, rostrum, and terminal segments ordinarily reddish.

Hitherto confounded with *P. meridionalis*, but very distinct. The examples from Monte Viso (Ghiliani) are smaller than those from Sicily, and darker; the head sometimes marked with blackish, and the apical margin of the sixth segment not edged with yellow.

9. PANORPA GHILIANII, n. sp. (Pl. IV. fig. 9).

Turin (received from the Chevalier Victor Ghiliani).

A small species, and strongly marked with black. In the anterior wings there is a small spot in the disc near the base, three spots before the middle, a small costal spot in the middle, a sub-apical fascia formed by a large costal spot emitting two narrow branches to the inner margin, and a very broad black apex, which encloses one or two pale dots at its upper and lower edges. Third abdominal segment (♂) not produced above; sixth formed as in *P. annexa*, but longer, and with the apex more produced above, as in *P. meridionalis*; seventh inserted below the excision, slightly shorter than the sixth, formed much like that in *P. annexa*, but shorter, thinner at the base, the upper edge less swollen, and the swelling further from the base, afterwards less concave and less elevated at the apical margin; eighth shorter than the seventh, sub-cylindrical, scarcely cone-shaped; appendices of the last segment short, flattened, rather broad, obtusely rounded at the apex, nearly parallel (a larger lobe at the base of the claws of this segment).

I have seen two ♂ and one ♀ of this distinct species.

10. PANORPA COGNATA, Rambur. (Pl. IV. fig. 10).

P. cognata, Rambur, Névrop. p. 330 (1842); Eaton, Ann. & Mag. Nat. Hist. 1867, p. 397; McLach. Trans. Ent. Soc. Lond. 1868, p. 216. *P. germanica*, Brauer, Neurop. Aust. p. 36 (*nec* Linn.). *P. alpina*, Hag. Ent. Ann. 1858, p. 32 (*nec* Rambur).

Central Europe, South of England, Belgium.

Wings less marked than any of the European species, excepting *P. alpina*, and the markings are brown, and not black or blackish; ordinarily there is a small dot at the commencement of the second sector, a large more or less quadrate spot at the pterostigma, scarcely united to a smaller one below it, and an irregular apical spot (but frequently there are only the apical spot and that at the pterostigma). The third abdominal segment is considerably produced in the middle of its apical margin above; sixth oblong, longer than broad, somewhat produced at its apex above, the sides excised; seventh sub-cylindrical, its upper edge scarcely swollen near the base, concave towards the apex, and with the apex slightly

elevated, rather shorter than the sixth; eighth cylindrical, obscurely cone-shaped; appendices of the terminal segment long, cylindrical, straight, slightly divergent. Head and terminal segments reddish.

Rambur was unacquainted with the locality of his type, and thought it might be exotic; but it undoubtedly represents this rather local European species.

(*Species insufficiently known to me*).

11. *PANORPA PICTA*, Hagen. (Pl. IV. fig. 11).

P. picta, Hagen, Wien. Ent. Monatsch. vol. vii. p. 199 (1863).

Asia Minor and South Russia.

The male of this species is yet unknown. Hagen's type from Asia Minor is a ♀, and I possess an example of that sex, received from Professor Zeller (*nigrirostris*, Zeller, MS.), collected by Kindermann in Southern Russia, which I believe to belong to this species, though it is considerably smaller (exp. alar. $14\frac{1}{2}$ lin. = $30\frac{1}{2}$ mill.) than the dimensions given by Hagen.

It is a large insect, with the body (rostrum included), save the terminal abdominal segments, deep black, and belonging to section B. The wings are broad and obtuse, slightly tinged with yellowish, and with the black markings strongly indicated. At the base of the disc of the anterior wings is an isolated spot, above which, on the costæ, is a smaller one; before the middle is a broad irregular fascia; in the middle of the costæ a large spot; a broad sub-apical fascia, forked in its lower half, and much constricted before the furcation; and a broad apical band, enclosing a large hyaline spot in its lower half.

The only European species with a complete fascia before the middle.

12. *PANORPA RUFOSTIGMA*, Westwood.

P. rufostigma, Westw. Trans. Ent. Soc. Lond. vol. iv. p. 186 (1846).

Albania.

Indicated by Westwood as perhaps a var. of *P. germanica*, and remarkable for its large red pterostigma. The type is in the collection of Mr. S. S. Saunders, of Corfu, and I am unable to give any more precise information concerning the species. A Grecian species is also noticed by Stein (Berl. Ent. Zeits., 1863, p. 414)

under *P. communis*, which may possibly be the ♀ of Westwood's insect; and both may be the same as *P. gibberosa* (*ante*, p. 64).

Description of a new species from Java.

PANORPA NEMATOGASTER, n. sp. (Pl. IV. fig. 12).

P. nigra. Thoracis dorsum rufc-varium; pectus pedesque rufi vel rufo-fusci. Abdominis segmentum 3um processu curvato supra in medio longe productum; 4tum tuberculo uno supra instructum; 6um 5to duplo longius, apicem versus gradatim paullo angustius, truncatum; 7um et 8um singulatim 6to duplo longius, per-angustum, apicem versus paullo gradatim dilatatum; 9um parvum, forcipe elongato, appendicibus crassis, rectis. Alæ per-angustæ, flavo-testaceæ, nitidæ, haud signatæ; pterostigma rufo-fuscescente. Tarsorum ungues bi-dentati.

Long. corp. ♂ $10\frac{3}{4}$ ''', ♀ 6''' ; exp. alar. ♂ $13\frac{1}{2}$ ''', ♀ 14'''.

Hab.—Java. In Muss. Brit. (Wallace), et Oxon.

♂. Head, antennæ, and abdomen dull black. Pronotum black, posteriorly reddish at the sides. Meso- and meta-nota red, the former black in front. Breast red, with two small black dots on each side. Rostrum reddish, with a broad lurid stripe down the front. Palpi reddish, the apical joint black. Legs reddish; claws of the tarsi with two broad and blunt teeth internally below the apex. Wings very narrow, shining pale yellowish testaceous, without markings of any kind, save that the pterostigma is slightly fuscescent; veins blackish, subcosta reaching to the pterostigma in the anterior wings. Abdomen very slender; third segment produced in the middle of its apical margin above, into a long slender curved process, slightly dilated at the extremity; fourth with a small tubercle in the middle above; third, fourth, and fifth nearly equal in length; sixth nearly twice the length of the fifth, gradually but slightly narrowed towards the apex, which is obliquely truncate; seventh and eighth each about twice the length of the sixth, very slender, the apex gradually dilated; ninth small, the forceps very long, the points curved and crossing each other, appendices short and thick, straight.

♀. Differs in the breast and legs being more obscurely reddish, somewhat fuscescent.

A singular species ; remarkable for the long and very slender abdomen of the male, and for the pale wings without markings, which give it somewhat the appearance of a small *Bittacus*. There is one ♂ and one ♀ in the collection of the British Museum (formerly in that of Mr. W. W. Saunders), collected in Java by Mr. A. R. Wallace ; and one ♂ in the Oxford Museum.

I do not know *P. Charpentieri* of Burmeister, from the "East Indies," which, from the brief diagnosis, is a very slender species, without markings, save one dot in each wing.

Note on the distribution of the genus Panorpa.

Up to the present time about thirty-six species have been noticed. In Europe and the adjoining countries, twelve ; some of these, no doubt, extend to North Africa, but the genus has not been brought from the tropical and southern parts of that Continent ; three are described from the Asiatic Continent, excluding Caucasia and Asia Minor ; five are indicated from Japan, some of which, probably, occur also in North China ; three from Java ; and about thirteen from North America. South America has not as yet furnished any species, though it is probable that some may occur in Chili. From Australia they are also absent, for *P. ruficeps*, of Newman, which comes from that quarter, should be referred to Westwood's genus *Euphania** as a second species.

* It appears to me that *Euphania* is identical with *Chorista* of Klug ; and that *E. luteola* is the same as *C. australis*.

Explanation of Plate IV.

(*Panorpa* ; a denotes apex of abdomen ; b, appendices).

- Fig. 1. Anterior wing of *P. alpina*, ♂. (1a, 1b).
 2. " " *P. caucasica*, ♂. (2a, 2b).
 3. " " *P. communis*, ♂. (3a, 3b).
 4. " " *P. germanica*, ♂. (4a, 4b).
 5. " " *P. gibberosa*, ♂. (5a, 5b).
 6. " " *P. connera*, ♂. (6a, 6b).
 7. " " *P. meridionalis*, ♂. (7a, 7b).
 8. " " *P. annexa*, ♂. (8a, 8b).
 9. " " *P. Ghilianii*, ♂. (9a, 9b).
 10. " " *P. cognata*, ♂. (10a, 10b).
 11. " " *P. picta*, ♀.
 12. *P. nematogaster*, abdomen of ♂, and terminal segment magnified.